

Response to Restriction Requirement

The Examiner has required restriction under 35 U.S.C. §121 and 372 to one of three inventions identified by the Examiner, designated Groups I-III.

Applicants elects the claims of Group I (claims 1-6, 9-11, 14-17 and 19-23) drawn to a method of making a transgenic avian using a lentivirus. Applicants expressly reserve the right to file divisional applications to the presently non-elected subject matter.

However, Applicants respectfully traverse the above requirement for restriction and request reconsideration of the groupings of the claims. Examiner submits that each identified group of inventions is not so linked so as to form a single general inventive concept under PCT Rule 13.1. In particular, Examiner submits that under the provisions of PCT Rule 13.2 that each of the identified claim groups lack a corresponding special technical feature in view of the teachings of Vick, *et al.*, Proc. R. Soc. Lond, 1993, Vol 251, pages 179-182.

Examiner submits that the cited document of Vick teaches the inventive concepts of Groups I and II. In this regard Examiner reasons that Vick teaches that “Stage XI PGCs are isolated from chickens, transduced with retrovirus, and immediately injected into the vasculature of Stage 15 chick embryos to obtain germline transmission of the transgene”. The foregoing is purported by the Examiner to disclose the inventive concepts of Groups I and II.

Applicants however disagree with this assertion. Firstly, the teachings of Vick do not disclose or suggest the use of Lentiviral vectors for transfection of PGCs. Vick teaches the use of two defective retroviruses, namely a defective spleen necrosis virus (SNO21) and a defective Avian leukosis virus (NLB). As discussed at the lower half of column 2 of page 181, the vSNO21 defective retrovirus was felt to be unstable and accordingly further experimentation was performed with an NLB vector. Central to the inventive concept embodied by Group I and Group II of the present invention is the use by the Applicants of lentiviral vectors.

Although a sub-group of the retrovirus family, lentiviruses exhibit significantly different characteristics which confer significant advantages in relation to the transfection and stable integration of exogenous DNA into the genome of cells. For example, lentiviruses can irreversibly integrate into the DNA of a host cell and further, can infect both proliferating and non-proliferating cells. The teachings of Vick in relation to the use of retroviruses do not disclose, suggest or even recognize the advantages of using lentiviruses as vectors.

Secondly, the level of transduction efficiency achieved using the method of Vick is entirely unsatisfactory. Applicants, in determining the inventive concepts of Groups I and Group II have identified that the use of lentiviral transgene constructs, as described in the instant invention, results in the germ cells of avian embryos being transduced with exogenous DNA at an unexpectedly high efficiency. This high level of transduction allows the methods and avians embodied by the present invention to be used in commercial techniques. The technique disclosed in Vick teaches of a method which results in a very low level of transgenic bird production (1-4% (see column 2, page 181 of Vick)), as opposed to a yield of 85% as taught by Example 2 of the instant invention.

Vick teaches that germinal crescents were isolated from embryos at stage 11. Examiner refers to stage 11 in the argumentation submitted in the restriction requirement as "Stage XI", however this is incorrect. The nomenclature used in relation to avian embryonic development uses a both Roman numerals and Arabic numerals, with these indicating different stages in embryo development.

The Hamburger and Hamilton (HH) procedure describing the progressive stages of embryo development during incubation is the most widely used normal table. This staging procedure sequentially categorizes the morphogenetic development of the chicken embryo from oviposition through hatching in 45 morphologically discrete stages. It was 25 years after the HH staging was introduced that embryo staging prior to oviposition was systematically described. In their work, Eyal-Giladi and Kochav (EGK) devised a 14-stage classification of the morphogenetic development of the early chicken embryo during the preoviposition, oviductal period. The stage XIV (EGK) blastoderm, which signifies the

completion of hypoblast formation, coincides with stage 1 of HH. Staging procedures similar to the EGK for the chicken have been described by Gupta and Bakst for the turkey and Dupuy et al. for the Pekin duck.

Accordingly, Applicants submit that the assertion that Vick teaches of the isolation of Stage XI PGCs is in fact incorrect. Rather, Vick teaches of the isolation of PGCs from germinal crescents obtained from embryos at stage 11 (as taught at the last line of page 179 and first line of column 1 of page 180 of Vick).

MPEP § 1893.03 states that prosecution of an international application which enters the national stage in the U.S. under 35 U.S.C. § 371(c) “proceeds in the same manner as for a domestic application with the exceptions that . . . (B) unity of invention proceeds as under 37 C.F.R. § 1.475,” which is governed by PCT Rule 13. Unity of invention under PCT Rule 13 is satisfied when there is a technical relationship among those inventions defined by the claims which involves “one or more of the same or corresponding special technical features.” This unifying special technical feature is that which defines a contribution which each of the claimed inventions, considered as a whole, makes over the prior art. PCT Rule 13.2 and the PCT Administrative Instructions, Annex B, Part 1(b).

Where a single patent application contains claims of different categories, the claims have unity of invention when all claims contain a special technical feature, and the claimed manufacturing process is specifically adapted to produce the claimed product. A process is “specifically adapted” for the manufacture of a claimed product when that process inherently results in the product. PCT Administrative Instructions, Annex B, Part 1(e)(i). According to the PCT Administrative Instructions, Annex B, Part 1(e)(iii), “[t]he words ‘specifically adapted’ are not intended to imply that the product could not also be manufactured by a different process.” Thus, the Examiner need only consider whether claims of different categories contain the same or corresponding special technical feature, and whether the claimed process of manufacture inherently produces the claimed product.

Here, the special technical feature of the Group I process claims and the Group II product claim relates to the use of lentiviruses in the delivery of exogenous genetic material

to avian embryonic cells. All claims in Group I and II contain this feature. Thus, the Group I and II claims have unity of invention.

The present case is analogous to Example 1 of the PCT Administrative Instructions, Annex B, Part 2(I), which illustrates independent process, product, and method of use claims that have unity of invention. In this Example, three independent claims are given: Claim 1 to a method of manufacturing substance X (represented in the present case by the immunogenic determinant); claim 2 to substance X; and claim 3 to the use of substance X. Unity exists between all three claims because all contain the special technical feature of substance X in common.

In the present case, the steps of claim 1 are required to make the transgenic avian defined in claim 7 and 8. Since both Group I and II claims possess the same special technical feature, the Group I and II claims have unity of invention.

Moreover, Example 7 of the PCT Administrative Instructions, Annex B, Part 2(I) shows that claimed method steps which produce a certain characteristic, and the characteristic itself recited in a product claim, can constitute the “same or similar special technical feature.” In this Example, claim 1 is directed to a stainless steel composition of a certain yield strength. Claim 2 is directed to a process of manufacturing a stainless steel composition of the same yield strength, but the yield strength is not specified. (According to Example 7, the specification indicated that the process would produce the critical yield strength.) The process steps which produce the critical yield strength, and the recitation of the yield strength in the composition claim, are considered to be the same special technical feature and thus the claims have unity of invention.

Here, method claim 1 recites steps which produce a transgenic avian using a lentiviral vector. Claim 7 recites a transgenic avian produced using the method of claim 1. The claim 1 process steps, and in the resulting transgenic avian of claim 7, therefore require the same special technical feature.

Finally, Applicant notes that unity of invention was found during international phase of this application; see the International Search Report published December 8, 2005 and subsequent International Preliminary Examination Report.

Because all claims of Groups I and II have the same special technical feature, and the claimed product is inherently made by the claimed Group I process, these claims have unity of invention. Applicant requests that the Group I and II claims be rejoined for examination on the merits.

Respectfully submitted

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